

tion in the intestine of these fish rather than in the usual site, the pyloric ceca, suggest that *Lepomis* spp. may not be its preferred host.

Other fish from this locality, number examined in parentheses, were not infected with *L. aphredoderi*: *Centrarchus macropterus* (5), *Ictalurus melas* (9), *Ictalurus natalis* (4), *Lepomis cyanellus* (4), *Lepomis gulosus* (12), *Lepomis macrochirus* (17), *Lepomis megalotis* (2), *Notemigonus crysoleucas* (12), *Notropis chrysocephalus* (5), *Pomoxis annularis* (2), and *Semotilus atromaculatus* (2).

At the second locality (McConnico Creek), southwest of Forkland, Greene County, Alabama, R2E T19N, Sec. 7), 4 male and 4 female (2 with eggs) *Leptorhynchoides aphredoderi*, ranging from 1 to 4 worms per infected fish, were obtained from 5 of 7 *Aphredoderus sayanus* collected during September 1990. Other fish from

this locality, number examined in parentheses, were not infected: *Esox americanus* (1), *Lepomis cyanellus* (1), and *Lepomis gulosus* (3).

No pronounced geographic variation was noted among the acanthocephalans when measurements of specimens from *Aphredoderus sayanus* of Alabama were compared with the original description from *A. sayanus* of Louisiana (Table 1).

Specimens have been deposited in the Manter Laboratory of the University of Nebraska State Museum, HWML No. 31745.

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Research Note

Gastrointestinal Helminths of the Northwestern Alligator Lizard, *Gerrhonotus coeruleus principis* (Anguidae)

STEPHEN R. GOLDBERG¹ AND CHARLES R. BURSEY²

¹ Department of Biology, Whittier College, Whittier, California 90608 and

² Department of Biology, Pennsylvania State University, Shenango Valley Campus, 147 Shenango Avenue, Sharon, Pennsylvania 16146

ABSTRACT: One hundred four specimens of *Gerrhonotus coeruleus principis* from Whatcom County, Washington, were examined for helminths. Three lizards (3% prevalence) were infected. Findings consisted of 1 *Oswaldocruzia* sp. from 1 specimen and 1 *Cosmocercoides* sp. from each of 2 specimens. These represent the first nematodes reported from *G. coeruleus principis*. Our findings are in agreement with previous studies which have indicated species-poor helminth communities for members of the genus *Gerrhonotus*.

KEY WORDS: Nematoda, *Oswaldocruzia* sp., *Cosmocercoides* sp., prevalence, helminth community.

The northern alligator lizard, *Gerrhonotus coeruleus*, ranges from British Columbia to the central coast and Sierra Nevada of California; it is also found in the Rocky Mountains of western Montana and northern Idaho (Stebbins, 1985). To our knowledge there have been no helminth

surveys of *G. coeruleus*, although Fitch (1935) reported nematodes to be abundant sometimes in the stomachs and intestines of *Gerrhonotus coeruleus coeruleus*. Voge (1953) found metacercariae, *Mesocercoides* sp., in *G. coeruleus*. The purpose of this note is to report the results of a helminth survey for *Gerrhonotus coeruleus principis* Baird and Girard, 1852, from western Washington.

We examined 104 museum specimens of *G. coeruleus principis* (mean snout-vent length, SVL = 79 mm \pm 14 mm; range 33-100 SVL). The specimens had been collected by hand along Chuckanut Drive, 1.6 km south of Bellingham, Whatcom County, Washington (48°42'N, 122°30'W), elevation ca. 30 m, during 1966, 1969, and 1970. The specimens were originally utilized

Table 1. Prevalence of gastrointestinal helminths in *Gerrhonotus* sp. of North America.

<i>Gerrhonotus</i> sp. Parasite	Locality	Prevalence (%)	Reference
<i>Gerrhonotus coeruleus</i>			
Cestode			
<i>Mesocestoides</i> sp. (metacestodes)	Contra Costa Co., CA	Not given	Voge, 1953
<i>Gerrhonotus coeruleus principis</i>			
Nematode			
<i>Cosmoceroides</i> sp.	Whatcom Co., WA	2 (2/104)	This paper
<i>Oswaldocruzia</i> sp.	Whatcom Co., WA	1 (1/104)	This paper
<i>Gerrhonotus multicarinatus webbi</i>			
Nematode			
<i>Oswaldocruzia pipiens</i>	Los Angeles Co., CA	2 (2/96)	Goldberg and Bursey, 1990
<i>Physaloptera retusa</i>	Riverside Co., CA	13 (4/30)	Telford, 1970
<i>Physaloptera</i> sp. (3rd stage)	Los Angeles Co., CA	1 (1/96)	Goldberg and Bursey, 1990
Cestode			
<i>Baerietta gerrhonoti</i>	Los Angeles Co., CA	64 (16/25)	Telford, 1965
<i>Mesocestoides</i> sp. (metacestodes)	Riverside Co., CA	7 (2/30)	Telford, 1970
<i>Oochoristica</i> sp.	Los Angeles Co., CA	1 (1/96)	Goldberg and Bursey, 1990

in a reproductive study (Vitt, 1973). They had been preserved in 10% buffered formalin. The body cavity was opened by a longitudinal incision from vent to throat. The esophagus, stomach, small intestine, and large intestine were slit longitudinally and examined under a dissecting microscope. The liver and body cavity were examined for the presence of *Mesocestoides* sp. Each helminth was identified using a glycerol wet mount.

Only 3 of the 104 specimens (3%) were infected with helminths. One female *Oswaldocruzia* sp. was found (Western Washington State College #5082, female, SVL 78 mm, large intestine). Two female *Cosmoceroides* sp. were recovered (CPS [=College of Puget Sound] #6838, male, SVL 83 mm, large intestine; CPS #8650, male, SVL 75 mm, small intestine). Since no male nematodes were recovered, we did not attempt specific identification. Prevalence for *Oswaldocruzia* sp. was 1% (1/104); prevalence for *Cosmoceroides* sp. was 2% (2/104). These nematodes represent new host records and they are the first identified nematodes from *G. coeruleus*. The nematodes were deposited in the U.S. National Parasite Collection (Beltsville, Maryland 20705, U.S.A.) as USNMHC Nos. 81215 and 81216 for *Oswaldocruzia* sp. and *Cosmoceroides* sp., respectively.

Investigations of *Gerrhonotus* sp. helminths are

summarized in Table 1. These data indicate a rather limited helminth fauna and infection rate when compared to lizards from other families (see Baker, 1987). Anguid lizards have a non-selective diet including small mammals, reptiles, insects, arachnids, millipedes, and snails (Stebbins, 1985). Pence (1989) suggested that a non-selective diet was 1 of several host criteria that could be used to predict a low-density, species-poor helminth community in mammals. The data of Table 1 would appear to support that claim for this species of reptile.

The observation of Fitch (1935) that abundant nematodes are sometimes seen in the stomach and intestines does not alter the suggestion of a species-poor helminth community for these lizards, but only suggests that there may be variability in helminth densities in various populations of *Gerrhonotus*. Fitch (1935) also mentioned finding flukes in the body cavity which we believe might have been *Mesocestoides* sp. metacestodes. The presence of *Mesocestoides* sp. has been reported for *Gerrhonotus* by Voge (1953) and Telford (1970). Whether limited helminth faunas are characteristic of *Gerrhonotus* must await further investigation of other members of this genus.

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Research Note

Biology of Cave Crickets, *Hadenoeus subterraneus*, and Camel Crickets, *Ceuthophilus stygius* (Insecta: Orthoptera): Parasitism by Hairworms (Nematomorpha)

EUGENE H. STUDIER,¹ KATHLEEN H. LAVOIE,¹ AND CLAY M. CHANDLER²

¹ Biology Department, University of Michigan-Flint, Flint, Michigan 48502-2186 and

² Department of Biology, Middle Tennessee State University, Murfreesboro, Tennessee 37132

ABSTRACT: Gordiid hairworms identified as *Chordodes morgani* were collected from a rivulet in Floyd Collins' Crystal Cave, Kentucky, and the hemocoel of camel crickets, *Ceuthophilus stygius*, and cave crickets, *Hadenoeus subterraneus*. These collections extend the range for *C. morgani* to include Kentucky and add 2 new host species for this parasite. Infection prevalences for adult camel crickets were 16.9% for females and 2.9% for males. Adult cave crickets showed low infection rates of 0.8% and 0.9% for males and females, respectively. Based on average hairworm biomass, growth was slow during the summer while hosts were sexually immature and then became very rapid as host crickets matured. Repression of ova development was seen in parasitized female camel crickets (34.0 ova/female vs. 2.2 ova/parasitized female).

KEY WORDS: *Chordodes morgani*, *Hadenoeus subterraneus*, *Ceuthophilus stygius*, parasite load, hairworm growth rate, crickets, Nematomorpha.

The occurrence of internal helminths (unidentified gordiid hairworms) in the camel cricket, *Ceuthophilus stygius*, and cave cricket *Hadenoe-*

cus subterraneus, was very briefly mentioned in Hubbell (1936) and in Hubbell and Norton (1978), respectively. Hubbell (1936) also indicated fly larvae of *Oedematocera flaveola* Coquillett as frequent parasites of camel crickets.

From March 1986 through July 1987, nearly monthly collections of cave and camel crickets were made in several caves in or near Mammoth Cave National Park, Kentucky (Walnut Hill, Great Onyx, White, and Floyd Collins' Crystal Caves as well as the Frozen Niagara and Austin Entrances to and Sophys and Marion Avenues of Mammoth Cave). In association with ongoing studies of the biology of these crickets (Studier et al., 1986, 1987a), collected individuals were dissected for several purposes including examination for macroscopic internal parasites.

Juvenile horsehair worms were found in some crickets of both species in the May through December samples. Additionally, 2 adult hair-